

WE CLAIM:

1. A device for anchoring a suture used in a surgical procedure to a coiled helical member, comprising winding means for winding a suture around the helical member in 5 a helical path such that the suture is attached to at least one turn of the helical member.

2. A device in accordance with Claim 1, further comprising a casing, said winding means being rotatable mounted 10 to said casing.

3. A device in accordance with Claim 2, wherein said casing is sized and shaped so as to be gripped by a hand of a surgeon.

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4. A device in accordance with Claim 3, wherein said winding means includes a winding tube rotatable about an axis, said winding tube being movable in an axial direction in response to its rotational movement.

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5. A device in accordance with Claim 4, wherein said winding tube includes securing means for securing at least one portion of the suture thereto so as to cause the suture to wind about the helical member.

6. A device in accordance with Claim 5, wherein
said securing means includes a groove formed in said winding
tube and sized and shaped so as to receive at least one portion
5 of the suture therein.

7. A device in accordance with Claim 6, wherein
said groove is angled in a direction substantially opposite to
the direction of rotation of said winding tube during the
10 winding of the suture about the helical member.

8. A device in accordance with Claim 7, wherein
said winding tube includes a plurality of first screw threads
formed thereon, said casing including a plurality of second
15 screw threads mating with said first screw threads such that
said winding tube is movable in said axial direction in
response to its rotational movement.

10. A device in accordance with Claim 9, wherein
20 said winding tube includes a first gear mounted thereon, said
casing including a first actuator movably mounted on said
casing and adapted for manual actuation by a surgeon, said
casing including a set of second gears, said first gear being
engaged with one of said second gears, said first actuator

being engaged with another of said second gears such that said first gear and hence said winding tube are rotatable in response to the movement of said first actuator.

5 11. A device in accordance with Claim 10, further comprising supporting means for supporting the helical member during the winding of the suture around the helical member.

10 12. A device in accordance with Claim 11, wherein said supporting means includes a guide tube rotatably mounted in said winding tube.

15 13. A device in accordance with Claim 12, wherein said guide tube includes a coiled spiral member at an end thereof, said spiral member being sized and shaped so as to receive the helical member therein during the winding of the suture about the helical member.

20 14. A device in accordance with Claim 13, wherein said guide tube is movable in said axial direction relative to said winding tube in response to the rotation of said guide tube.

15. A device in accordance with Claim 14, wherein said guide tube has an opening extending through said spiral member, said opening being sized and shaped so as to receive the helical member therein.

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16. A device in accordance with Claim 15, wherein said spiral member includes a plurality of lobes extending radially inwardly into said opening, said lobes forming a plurality of spaces positioned radially outwardly from said 10 opening.

17. A device in accordance with Claim 16, wherein said guide tube includes a plurality of third screw threads formed thereon, said casing including a plurality of fourth 15 screw threads mating with said third screw threads such that said guide tube is movable in said axial direction in response to the rotational movement of said guide tube.

18. A device in accordance with Claim 17, wherein 20 said guide tube includes a third gear mounted thereon, said casing including a second actuator movably mounted on said casing and adapted for manual actuation by a surgeon, said casing including a set of fourth gears, said third gear being engaged with one of said fourth gears, said second actuator

being engaged with another of said fourth gears such that said third gear and hence said guide tube are rotatable in response to the movement of said second actuator.

5 19. A device in accordance with Claim 18, further comprising a support rod extending through said guide tube for positioning the helical member in said opening of said spiral member of said guide tube.

10 20. A device in accordance with Claim 19, wherein said support rod includes a distal end sized and shaped so as to engage the helical member.

15 21. A device in accordance with Claim 20, wherein said distal end of said support rod is sized and shaped so as to engage the helical member by a friction fit.

20 22. A device in accordance with Claim 20, wherein said support rod is sized and shaped so as to support additional coiled helical members thereon.

23. A device in accordance with Claim 22, further comprising advancing means for advancing the additional helical members forward in said axial direction.

24. A device in accordance with Claim 23, wherein said advancing means includes a plunger mounted on said support rod, said plunger being movable in said axial direction.

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25. A device in accordance with Claim 1, wherein said winding means includes a winding tube rotatable about an axis, said winding tube being movable in an axial direction in response to its rotational movement.

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26. A device in accordance with Claim 25, wherein said winding tube includes securing means for securing at least one portion of the suture thereto so as to cause the suture to wind about the helical member.

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27. A device in accordance with Claim 26, wherein said securing means includes a groove formed in said winding tube sized and shaped so as to receive at least one portion of the suture therein, said groove being angled in a direction substantially opposite to the direction of rotation of said winding tube during the winding of the suture about the helical member.

28. A device in accordance with Claim 1, further comprising supporting means for supporting the helical member during the winding of the suture around the helical member.

5 29. A device in accordance with Claim 28, wherein said supporting means includes a guide tube rotatably mounted in said winding means, said guide tube including a coiled spiral member at an end thereof, said spiral member being sized and shaped so as to receive the helical member therein during
10 the winding of the suture about the helical member.

30. A device in accordance with Claim 29, wherein said guide tube is movable in an axial direction relative to said winding means in response to the rotation of said guide
15 tube.

31. A device in accordance with Claim 1, further comprising a support rod extending through said winding means for supporting the helical member relative to said winding
20 means.

32. A device in accordance with Claim 31, wherein said support rod includes a distal end sized and shaped so as to engage the helical member by a friction fit.

33. A device in accordance with Claim 31, wherein
said support rod includes a distal end sized and shaped so as
to engage the helical member, said support rod being sized and
shaped so as to support additional coiled helical members
5 thereon.

34. A device for anchoring a cord to a coiled
helical member, said device comprising winding means for
10 winding a cord around the helical member in a helical path such
that the cord is attached to at least one turn of the helical
member.

35. A device in accordance with Claim 34, wherein
15 said winding means includes a winding tube rotatable about an
axis, said winding tube movable in an axial direction in
response to its rotational movement.

36. A device in accordance with Claim 35, wherein
20 said winding tube includes securing means for securing at least
one portion of the suture thereto so as to cause the suture to
wind about the helical member, said securing means including a
groove formed in said winding tube sized and shaped so as to
receive at least one portion of the suture therein, said groove

being angled in a direction substantially opposite to the direction of rotation of said winding tube during the winding of the suture about the helical member.

5 37. A device in accordance with Claim 36, further comprising a guide tube for supporting the helical member during the winding of the suture around the helical member, said guide tube being rotatably mounted in said winding tube, said guide tube including a coiled spiral member at an end 10 thereof, said spiral member being sized and shaped so as to receive the helical member therein during the winding of the suture about the helical member.

15 38. A device in accordance with Claim 37, wherein said guide tube is movable in said axial direction relative to said winding tube in response to the rotation of said guide tube.

20 39. A device in accordance with Claim 38, further comprising a support rod extending through said guide tube for positioning the helical member in said spiral member of said guide tube.

40. A method of anchoring a suture used in a surgical procedure to a coiled helical member, comprising the steps of supporting the helical member relative to a winding tube; and moving said winding tube relative to the helical member such that the suture is wound about the helical member in a helical path so as to attach the suture to at least one turn of the helical member.

41. A method in accordance with Claim 40, wherein said winding tube is rotatable about an axis, said winding tube being movable in an axial direction in response to its rotational movement.

42. A method in accordance with Claim 41, wherein said supporting step includes the step of positioning the helical member in a coiled spiral member of a guide tube.